Findings on opportunities for California's livestock industry

Two factors principally drive change on California's rangelands. One is the low profitability of ranching, which is similar to the livestock industry in other parts of the United States. The second is the impact of population growth on land values, perceptions of ranching, and redefining the goods and services that are expected of rangelands.

If owners cannot make sufficient money to survive from ranching, they must turn to other activities to raise income or leave ranching.

Of these two factors, urban influences appear to be much more important in the decision to convert rangeland from ongoing range enterprises and also in developing alternate income streams. Urban values also have modified perceptions of ranching and what the public expects of rangelands. While development is necessary for California, it brings with it a host of further negative impacts on traditional land management activities like ranching. These include more people, roads, traffic, and pets; more diverse opinions about how land should be used; and neighbors that do not know much about ranching and related land uses.

If owners cannot make sufficient money to survive from ranching, they must turn to other activities to raise income or leave ranching. In California's urban society, the highest land values are usually associated with development. This places much pressure on ranchers to sell for development rather than continue at the economic margin.

At the same time, maintenance of a viable range industry as part of the working landscape may provide a much wider set of policy options to respond to the demand for open space, habitat, and vistas as part of the working landscape. If landowners can remain economically viable, they can maintain and manage their land in larger parcels. Larger parcels of rangeland are much better at supporting many kinds of uses that society increasingly values such as open space, biodiversity, recreation, amenities, and even water.

In addition, the ability to acquire land is limited by available private and public funds. While no comprehensive study has been done of the overall rangeland that needs to be acquired in California to meet public needs, the amount almost certainly exceeds available funding. This adds to the importance in maintaining the profitability of private rangelands as an alternative to acquisition. Often it costs less to support profitability than to purchase land directly. This idea is increasingly reflected in the development of land trusts and the use of conservation easements and related tools.

Thus, concerns over the declining profitability of agriculture and ranching also blends with interest of the public in protecting farmlands and ranches. Such interests occur for many overlapping reasons, such as the wish for open space, the desire to control urban expansion, increased self-sufficiency in food, and even the hope of preserving the ranching way of life.

In reviewing the picture of rangelands in California in 2002, four categories of opportunity emerge:

- Anticipating and dealing with land use conflicts that arise from the pressures of urban expansion operations. Land use conflicts go both ways between ranchers and new neighbors. New neighbors can be concerned over such things as chemicals, dust, odors, and traffic. At the same time, the rancher may face attitudes that are intolerant of ranching and add to management problems, such as the impacts of stray dogs, trespassing, and vandalism. These themes are found most often at the local and regional levels where land use planning processes and zoning decisions indicate support for continued ranching and the spread of urban areas into farming areas.
- Development of economic opportunities for ranchers in an urban and global context. A wide range of programs address new products, new markets, and new ways of doing business such as direct marketing that help the profitability of ranching.
- Enhancing the ability of ranchers to meet environmental and health requirements. New environmental requirements may bring with them incentives, financing, technical training, education, or direct provision of government services to help ranchers meet these requirements.
- Preserving larger tracts of rangeland under pressure of land division. Zoning laws and land conservation tools such as incentives payments and conservation easements have helped ranchers maintain their tracts. Ranchers themselves formed the California Rangeland Trust in 1997 to help maintain sustainable rangelands. In addition, a number of large ranching tracts have been acquired in recent years by governmental agencies, conservancies, and private parties that do not make a living from ranching. These large tracts often continue grazing operations at some level and serve as a source of support for other rangeland values.

The opportunities often overlap, and a wide variety of tools have emerged that may address several of these themes at the same time. Table 18 lists examples of such tools that are now used to help ranchers and to preserve rangeland. These include such things as preferential zoning; right-to-farm ordinances; incentives payments; the development of new products and markets; and technological research, development, and information sharing. Tools also include a host of rangeland tenure arrangements such as conservation easements and even outright acquisition by land trusts and governmental agencies.

Table 18. Tools to assist ranchers

Management of conflicts from urban pressure	Improved economic opportunities	Meeting health, public safety, and environmental requirements	Preserving significant rangeland tracts
Right-to-farm laws, real estate reporting requirements	USDA marketing and research programs	Federal and state animal and wildlife disease research and control	Preferential tax values under Williamson Act, Farmland Security Act
Local zoning designations, controls on city expansion, etc.	Industry check-off programs	UC extension, CA rangeland water quality management plan and Natural Resources Conservation Service (NRCS)	Direct acquisition by governmental agencies, land trusts
Land use planning and project mitigation	New product research, such as biofuels	Use of controlled fire/biomass support	Partial acquisition via conservation easements and payments
Education, local demonstration, fairs	Government support for risk management	Aggressive border inspections for disease and pests; County Agriculture Commission	Fed emergency aid programs
Information sharing and joint rangeland monitoring efforts	Enhanced international markets	State wildland fire control for rangelands	More favorable estate tax provisions.

Government policy instruments in range and agriculture: Governmental policies with respect to agriculture, and to the livestock segment in particular, can be characterized in three ways: information creation and dissemination tools; economic or other incentives; and regulatory requirements. These follow an entire spectrum where involvement by ranchers is voluntary or fully required. See Agri-Environmental Policy at the Crossroads: Guideposts on a Changing Landscape. Historically, livestock owners have favored information and technical assistance to reduce costs, reach markets, and respond to regulatory needs. In recent years, two trends have been apparent. One has been the move toward more regulatory approaches embodied in several federal laws such as the Clean Air and Clean Water Acts. At the same time, there has been a move away from inflexible applications of these laws to more management and land acquisition options. See the Assessment section Institutional Framework: Governance Shifts in the 1990s.

Management impacts from urban pressure

Local government has dealt with ranching mostly through application of public health regulations and in land use decisions. Both public health regulation and land use decisions sometimes have to address public concerns over noise, odors, chemicals, farm vehicle traffic, and animal management practices. At the same time, local governments try to respond to impacts of urban residents on ranchers, such as pets killing livestock or trespassing. Local land use decisions determine such factors as the spacing and conditions of development that spreads into rangeland areas. These decisions may cause land ownership patterns that break up larger ranching areas. On the other hand, they may seek to preserve open space and agriculture by emphasizing high-density housing and use of buffers between residents of urbanizing areas and surrounding agricultural or rangeland. See Agriculture in Urbanizing Communities.

Local land use decisions determine such factors as the spacing and conditions of development that spread into rangeland areas.

California has a number of special information and education programs such as the Farmland Mapping Program in the Department of Conservation and the passage of the "Right-to-Farm" ordinances by a number of jurisdictions. See County Right-to-Farm Ordinances in California: An Assessment of Impact and Effectiveness.

Continuing urban pressure does take a toll on the attitudes of ranchers. A recent survey of rural ranchers in Contra Costa and Alameda counties and rural Tehama County suggests that urban ranchers

feared local land use planning much more but worried less about the fate of their ranch if sold. No new ranches had appeared in the urban sample in ten years. In contrast, rural ranchers felt less threatened by local land use planning and wanted their property to be a productive ranch even if sold. Most of the ranchers enjoyed ranching and its associated family life; however, they felt that urban California was becoming more hostile to the livestock industry (Liffman et al., 2000).

In the case of ranchers, county general plans, urban limit lines, and right-to-farm ordinances have been developed to support ranching activities. For example, right-to-farm ordinances were first adopted in California in the 1980s. About 40 counties and 50 cities now have such measures. They are primarily informational, and counties seldom provide oversight in their implementation but they are still a useful tool. Some help also comes from the Williamson and Farmland Security Acts. These laws reinforce the importance of farming and ranching to California.

Historically, California has also helped ranchers improve range with prescribed fire. In recent years, the program has continued at a smaller funding level. In the last decade, use of prescribed fire has been more focused on reduction of fuel hazards near communities than on range improvement.

Given the diversity of California's rangeland landscape and communities, there is no single approach to dealing with urban impacts. Each community must find a way to balance urban growth and still protect key ingredients of traditional farming and ranching ways of life. This increases the importance of developing ways for newcomers and old time residents to understand each other and to work out differences (Sokolow, 2000).

Improved economic opportunity

Ranchers must find a way to address the economic impacts of exotic pests and diseases, increased costs associated with nearness to the urban edge, global markets, and the consolidation of agribusiness. Approaches to improved economic opportunity are a mix of efforts from governmental agencies and the livestock industry itself.

Ranchers must find a way to address the economic impacts of exotic pests and diseases, increased costs associated with nearness to the urban edge, global markets, and the consolidation of agribusiness.

Efforts to improve profitability for livestock come from actions such as improving quality of existing products, lowering production costs by increasing efficiency, improving markets, and developing new niche products. Often these are done in cooperation with governmental agencies for research, education, and related support.

Improved quality of existing products

Overall, quality of livestock is high in California. For example, beef quality is good with most of the quality concerns in non-fed beef sold directly from farms and ranches or at auctions (mentioned at a California State University, Fresno workshop the results of the National Market Cow and Bull Quality Audit to the attending beef producers). Better quality products reflect changed breeds through better stock selection. In the case of cattle, California breeders produce leaner, faster maturing beef cattle that also have retained their flavor (Campbell, 2000).

Lowering production costs

Production costs can be lowered by any actions that reduce different categories of expenses, such as planning and management, livestock acquisition and health, feed, labor, regulatory compliance, and debt or financial carrying costs. Examples of recent developments include:

Planning and management improvements provide one significant opportunity. Regarding both animal health and production, veterinarians have been the most important sources of information for operators. In addition, university extension, salespersons, other producers, magazines and journals, and producer associations are significant resources.

Ranchers have received help in planning and management by the application of information technology (Mueller, 2000). California farmers' access to the Internet is 46 percent; double the level of 1997 (Krauter, 2000).

More specifically, in a sampling of the cow-calf operations in California, on-farm computer use doubled from 1993 to 1997. Use of hand-written records, as opposed to no records, increased by 15 percentage points. This shows more cow-calf producers are recognizing the value of good information for decision-making (Animal and Plant Health Inspection Service, 1998).

In addition, ranchers on a limited basis are using information technology via the Internet and satellite dishes to market their beef cattle. Ranchers with a satellite dish can connect to video marketing. An example of a satellite auction service is a firm based in Cottonwood, California that sells about 250,000 cattle from 13 western states each year. See Western Video Market. The process starts when a video auction representative comes to view the producer's ranch and videotapes their cattle at no charge. The sale catalogue contains information such as the weight of the cattle. The catalogue is distributed to potential buyers prior to the auction. The videotape is broadcast via satellite on sale day across the country. Buyers register before the auction and can either be present or call on sale day to purchase cattle (Evans, 2000). However, whatever the potential, a recent survey finds only very limited use of high-tech marketing tools (Anderson et al., 2002).

One of the recent emphases in federal agricultural policy has been to help ranchers understand and deal with risk. Over the last decade, Congress has passed two laws to help with risk: the Federal Agriculture Improvement and Reform Act of 1996 (P.L. 104-127) and the Agriculture Risk Protection Act of 2000 (P.L. 106-224). The USDA Risk Management Agency (RMA**)** provides agricultural producers with the opportunity to achieve financial stability through effective risk management tools.

Management costs can also be lowered by new technologies in grazing management, livestock production, and processing. Where controlled pasturage is available, an example is use of "rotational grazing." This technique has been growing in popularity over the last few years and seeks to allocate available forage in a way that balances animal nutrient demand over the grazing season with forage supply. Control of nutrient demand requires attention to classes of livestock and stages of lactation and gestation. Forage supply is influenced by types of forage species sown, fertilization, pasture subdivision, and grazing management. This can involve use of higher density herds that are moved more frequently through pastures. Rotational grazing also can be practiced in a rangeland situation. Ranchers can graze their irrigated land in the summer and rest non-irrigated range then graze that land in the winter (Bopp, 2002).

Livestock acquisition and health have been helped greatly by application of genetic technology and disease control programs. Use of genetic selection practices is widespread among California breeders and helps select desirable animals. With veterinarian, university, and governmental assistance, ranchers are improving health practices and the ability to respond to the outbreak of infectious animal disease.

With veterinarian, university, and governmental assistance, ranchers are improving health practices and the ability to respond to the outbreak of infectious animal disease.

Livestock owners have relied on incentive or other payment programs especially to offset costs from environmental or health requirements. Some of these incentives relate to meeting environmental goals. Examples include annual payments for the retiring Conservation Reserve Program and the Wetland Reserve Program. There are also payments to offset the cost of agricultural conservation such as land use payments for adopting specified best management practices like the Water Quality Improvement and the Environmental Quality Incentives Program. Federal and state agencies also aid in predator control.

Regulatory compliance costs have been limited in the case of water quality by the implementation of the California Rangeland Water Quality Management Plan. This approach is implemented by a cooperative effort between the University of California Cooperative Extension, NRCS, ranchers, and the State Water Resources Control Board. The result is a more flexible program that can be applied usually without the costs of permit development.

Lowering debt or financial carrying costs occurs in a variety of ways. One is the use of reduced cost government loans or risk insurance made available under various federal laws. For many years, one of the tenants of federal farm policy has been to respond to the special financial needs of farmers and ranchers. For example, the Farm Service Agency (FSA) was established in 1994 under the Federal Crop Insurance Reform and the Department of Agriculture Reorganization Act to help farmers stay in operation. Two of the functions of the FSA are emergency loans and emergency and disaster assistance under the 1994 public law 103-354.

Another example is the savings in property taxes from application of Williamson Act zoning. It is estimated the Williamson Act can save agricultural landowners from 20 to75 percent in property tax liability each year or approximately $120 million Statewide. A survey of landowners in Williamson Act contracts concluded that one in three would not be farming or ranching without the Act's financial benefits (Souza, 2000).

A survey of landowners in Williamson Act contracts concluded that one in three would not be farming or ranching without the Act's financial benefits.

Cost offsets for management practices also occurs via conservation easements or other legal instruments that provide money for management practices that meet conservation goals or improve wildlife habitat. These occur in partnership with federal and State agencies or non-profit organizations such as the Nature Conservancy.

Improving markets

Government places a key role in helping industries improve markets. This can be done in several ways: direct purchase, facilitating industry market development, and providing market research and information. Major funding for such programs, as well as to support agriculture and ranching during

difficult economic times has come from the 1996 Farm Bill, 1998 Emergency Appropriations ($6 billion in FY 1999), 1999 Emergency Appropriations ($9 billion in FY 2000), the 2000 Agricultural Risk Protection Act ($5.5 billion in FY 2000; $1.6 billion in FY 2001), and FY 2001 Emergency Appropriations ($3.5 billion in FY 2001).

Direct payments are a form of assistance where government directly supports production. One example is the direct purchase of domestic lamb under the Lamb Adjustment Program (U.S. International Trade Commission, 1999). Another would be a wool marketing loan/deficiency payment program designed to help sustain wool production contained in proposed House of Representative version of the 2002 Farm bill (H.R. 2646). A third example would be the past Wool Act.

Facilitating industry market development has been a partnership. One example is the Commodity Promotion, Research, and Information Act (7 U.S.C. 74001-74025). Under this act, industries can develop self-assessment or "check-off programs" to raise funds for their promotion.

Another example is financial assistance for industry marketing and development. For example, as part of the 1996 Farm Bill, Congress approved the National Sheep Industry Improvement Center. Congress appropriated $20 million as initial capital for the Center to become a revolving fund to help the United States sheep and goat industry.

The government has also facilitated labeling standards for private goods. This involves such things as certification or "eco-labeling" guidelines for organic products.

Efforts to increase domestic or foreign markets can increase both output and prices, at least in the short run. When short run supply is inelastic, increased advertising can cause price increases. In the longer run, global supply will limit price increases. Livestock commodities have inelastic demands. This can affect the use of advertising and promotion programs. For example, if the cattle industry increases its promotional expenditures, sales and prices of beef may not change much if the pork industry follows suit. It is possible that overall advertising and promotion in the meat industry in the long term may not raise total sales, but shift market shares of various meat products. See Richard D. Green, Department of Agriculture and Resource Economics, UCD.

Providing market research and information takes several forms. USDA provides most of the federal information functions for ranchers. Examples include the Economic Research Service and the Agricultural Statistics Service that provide information and statistics relevant to agriculture and ranching. The Foreign Agricultural Service also provides information and contacts for international markets, as well as actively promoting international agricultural trade policies that provide market access for U.S. agricultural commodities.

Within California, market research and information is provided by the California Department of Food and Agriculture and the University of California, especially through its county extension advisors. County agricultural commissioners also provide some information, as well as apply a variety of regulations and reporting requirements.

Creation of marketing commissions that focus on products is another approach. The California sheep industry acted to create its own Commission in 1999. See California Sheep Commission. Like similar agricultural marketing commissions in California, the commission is funded from sheep producers and can use its dollars to promote sheep and sheep products, to conduct education and research that would help sheep producers, and to provide funding to aid in the

protection of livestock. Efforts so far have been directed at creating promotional materials and an annual lamb festival. See Dixon Lambtown USA. A series of promotional materials featuring the California Lamb logo have been developed.

Specifically sheep

After a decade of declining markets, the American Sheep Industry Association commissioned studies in 1991 and again in 1997 to analyze the lamb industry and market. The 1997 consultant's report made many recommendations for steps the domestic industry needed to take to become more competitive both with imported lamb and other meat proteins.

The sheep industry has developed an ambitious plan to improve industry efficiency, cost-effectiveness, and to increase consumer demand. Production-side improvements include: 1) genetic improvements to sheep in order to increase carcass weight, increase the lambing ratio, develop "easy-care" sheep, and increase the production of sheep dairy products; 2) development of new technologies and production processes; 3) formulation of new industry alliances; 4) development of reproductive and therapeutic drugs; 5) disease control including scrapie and other diseases; 6) food safety improvements; and 7) reduction of predator loss. Demand-side programs include development of new more "user-friendly" lamb meat products, new packaging, and marketing and promotion activities. See American Sheep Industry Association.

The industry has also been developing the National Sheep Industry Improvement Center. The $20 million in funds allocated by Congress were intended for loans, loan guarantees, cooperative agreements, and other financial instruments to enhance production and marketing of sheep, goats, and related products. See National Sheep Industry Improvement Center. After delays until early 2000, with the National Livestock Producers Association acting as intermediary, the revolving fund became operational.

In response to the impact of imported lamb, President Clinton in 1999 set out a three-year, $100 million program to assist the lamb industry (American Sheep Industry Association, 2001). This program provides for $65 million over a total of three years for productivity improvements, market promotion, domestic lamb meat purchases, and scrapie eradication. The largest part of this is the Domestic Lamb Industry Adjustment Assistance Program, which provides $10 million each year for three years.

As part of the adjustment program in 2000, the U.S. Department of Agriculture (USDA) funded a $1.8 million grant for a promotional campaign to market lamb. The grant was awarded for use in five project areas: 1) consumer positioning; 2) U.S. lamb identification program; 3) retail marketing and new product development; 4) American lamb information center; and 5) culinary outreach (American Sheep Industry Association, 1999). The USDA has also authorized a lamb check-off program.

In addition, in 1999, at the request of the U.S. lamb industry, the USDA appointed a taskforce representative of all industry segments to investigate lamb check-off. After further work, the Secretary of Agriculture published on September 21, 2001, a proposal for nationwide public comment. The program would be administered by a Lamb Promotion, Research, and Information Board appointed by the U.S. Secretary of Agriculture. The proposal covers only domestic lamb and is expected to raise about $3 million per year. The proposal sets an assessment of $.05 per pound on live weight paid by producers and feeders and 30 cents per carcass paid by lamb packing companies. The vote by the industry would not occur before 2004 (American Sheep Industry Association, 2002c).

Specifically beef

In the case of beef, Congress passed the Beef Promotion and Research Act in 1985 that established a coordinated program of promotion and research designed to strengthen the position of beef and beef products in the marketplace. This included maintenance and expansion of domestic and foreign markets and uses for beef and beef products. As provided in the Act, the Secretary of Agriculture issued a Beef Promotion and Research Order effective July 1986. The order established the Cattlemen's Beef Promotion and Research Board. It consists of 110 members who are representatives of the cattle industry in the United States including importers. The program is funded by a one dollar per head assessment on domestic sales of cattle and on imported cattle, beef, and beef products. The Board receives all assessment revenues.

Efforts under this program have been directed at a variety of programs. Since 1997, efforts have been directed at developing and marketing new products that meet consumer demands for convenience, quality, and consistency. Since 1998, beef check-off dollars have helped bring more than 50 new products forward and sales of convenient new beef products have increased by over 41 percent since 1998. Industry survey data show a significant increase of consumer awareness of convenience-based beef products (Cattlemen's Beef Board, 2001). Beef check-off programs in 2000 focused mostly on consumer convenience and nutrition, especially at making it easier to understand the wide selection of products available at the retail meat case (Meat Industry Internet News Service, 2000).

For the most part the cattle industry in California has focused on increased marketing activities. This is because the industry is already highly efficient. The California Cattlemen's Association and cooperative extension livestock advisors in county offices collaborate in this effort.

Developing niche products

Especially in the Internet age, "niche" markets can be highly profitable. They are characterized by highly specialized products made for a specific clientele or market. Niche markets for cattle and cattle products in California are very small and take many forms. Examples include beef sold through cooperatives and farmers markets, grass-fed beef, and organically certified beef.

While the potential for success may be significant, the development of niche markets requires many things: understanding of market forces; good marketing techniques; flexibility; sufficient capital; and a long-term commitment (Daley, 2002).

A small niche market for beef in California is grass-fed cattle. Grass-fed livestock is raised mostly on pasture and animals typically do not receive hormones or antibiotics. It appeals to parts of the public that prefer beef that is raised with less use of chemicals.

UC Extension has carried out research on three case studies of grass-fed beef in northern California. The conclusions were: it is hard to succeed in establishing a new niche market for cattle; ranchers face a substantial challenge in educating consumers about grass-fed beef; and a rancher must have an operation with enough cattle to keep costs competitive in both wholesale and retail cattle markets (Nader and Blank, [ND]).

Still, examples exist in California where it has been possible to establish a grass-fed beef niche. While this market is very small, U.C. Extension has been active in facilitating alternatives for marketing grass-fed livestock. An example of this effort was a meeting in mid-2002 of the Natural and Organic Livestock Workgroup in Marin County. About 20 ranchers attended. A similar type of local marketing effort is in progress in six Sierra Nevada counties, coordinated by UCCE advisors for Plumas-Sierra and Placer counties.


Natural and Organic Livestock Work Group

Another niche is organically grown foods. Organic crops and livestock products now make up less than one percent of total U.S. production. There are still considerable obstacles to adopting large-scale organic production systems, such as lack of capital and limited processors and distributors. In 1997, California had about 400 head of certified organic beef cattle and about 1,100 certified organic milk cattle (Economic Research Service, 1997). From 1997 to 2000, some growth has occurred in the organic livestock industry. Organic beef production has increased in Colorado, while organic dairy production has risen in Maryland and in California (Foreign Agricultural Service, 2001).

In some cases, farmers and ranchers are turning to ranch tourism as a niche product for additional income (Marysville Appeal Democrat, 2001). This "agri-tourism" markets the farm and ranch experience to urban residents. Ranch examples include participating in cattle drives (Tulare County), viewing a cashmere operation (Calaveras County), and hayrides (various). A wide range of activities and income sources can be involved, such as using a fish pond, displaying of antique or historic wares, and selling bakery goods, jerky, or other food. Experiences can also include hiking or riding on farm trails. For example, the USDA has awarded a matching grant to the Regents of the University of California to foster the preservation of farmland and agriculture in the Yolo-Solano-Napa region through the development of farm trails and agri-tourism (U.S. Department of Agriculture, 2001).

Help to meet health, public safety, and environmental requirements

Health requirements faced by ranchers relate mostly to animals, food, and to spread of animal disease. In the case of animals, the USDA controls animal related aspects of the livestock industry. For food requirements, the federal Food and Drug Administration (FDA) has significant authority. They control many aspects of the meat and meat products industry. In general, State support of the livestock industry in these areas comes through programs in the California Department of Food and Agriculture and the University of California, especially Cooperative Extension. See University of California Cooperative Extension.

Some diseases such as foot-and-mouth disease are very contagious and spread rapidly. Federal and State policies emphasize rapid identification and containment of any outbreak.

Commencing in 1986, the beef industry began the National Beef Quality Assurance Program. Since 1994 the program has trained more than 4,000 California cattlemen and women to identify and contain diseases such as BSE, Brucellosis, E. Coli O157:H7, Johne's and Tuberculosis that pose a risk to human health (Maas and Oltjen, 2003). The California Cattlemen's Association started its own program in 1992 with California Beef Council pilot funding. The Quality Assurance Program also gives information on how to improve the health of animals and to avoid practices that damage meat or the carcass. It also works with the UC Cooperative Extension

and others to meet the changing needs of the cattle industry in California. See California Cattlemen's Association Quality Assurance Program.

In the case of animal diseases, some diseases such as foot-and-mouth disease are very contagious and spread rapidly. Federal and State policies emphasize rapid identification and containment of any outbreak. The policies also emphasize keeping diseases out of the country and out of California. Under California's brucellosis regulations, all female cattle, all bison, and all male cattle more than 18 months of age, including those from neighboring states, require a permit from the Department of Food and Agriculture before they can enter California. If an outbreak is identified, then quarantine of infected animals and areas will usually follow. This can limit the ability of an owner to move livestock or to conduct operations. In the extreme case, it can lead to destruction of the herd. See California Response to Foreign Animal Disease: A Multi-Agency, Statewide Plan for Response.

Similarly, in 2001, Governor Gray Davis ordered the California Department of Food and Agriculture (CDFA) and the Office of Emergency Services to strengthen efforts to detect any spread of the animal diseases plaguing Europe including bovine spongiform encephalopathy (BSE or mad cow disease) and foot-and-mouth disease. The departments enhanced the existing animal disease exclusion program for infectious diseases. CDFA provided 18 additional inspectors to the U.S. Department of Agriculture's inspection teams at the San Diego, Los Angeles, and San Francisco international airports. CDFA also recommended that livestock owners take special precautions when visiting other farms, livestock markets or livestock fairs. See Ranchers Wary as Foot-and-Mouth Disease Spreads. Federal and State agencies also provide funding for research into diseases that affect livestock. For example, the USDA has funded research into scrapie in sheep.

The primary public safety concern related to rangelands is wildfire. Historically, California has helped rangeland owners to improve forage on hardwood rangelands through prescribed burns. More recently, efforts have also focused on fuel reduction. As urban areas expand into grass and hardwood areas, two kinds of wildfire threat happen: there is a bigger risk of fires that start near homes that can burn into grass and trees and become a wildfire; and there is a larger chance that wildfire may burn from trees and grass into homes. Thus, as spelled out in the California Fire Plan, wildfire threatens both range values and homes.

The most significant environmental requirements on the range industry are probably the Federal Clean Water Act and the Federal Endangered Species Act. In California, the primary impact of grazing on an endangered species has been in desert terrain used by the desert tortoise. Federal agencies are working to resolve these concerns with ranchers.

In the case of the application of the Clean Water Act (CWA), compliance is achieved through implementation of the California Rangeland Water Quality Management Plan. Ranchers, the State Board of Forestry and Fire Protection, the University of California Cooperative Extension, and the USDA Natural Resource Conservation Service developed this plan. It is a voluntary plan that contains rangeland water quality management strategies, policy and coordination mechanisms, model water quality plans, and sources of assistance. It was adopted by the State Water Resources Control Board in 1995 to meet CWA standards.

In a few hydrologic units, as defined by the State Water Resources Control Board, ranching is listed under Section 303(d) of the Clean Water Act as a cause of non-point source pollution that is causing special problems in a watershed. As of 1998, rangeland is listed as a non-point pollution source in 27 hydrologic units, most are located in the eastern Sierra Nevada and a few within the north and central coasts of California. In this case, ranchers will sometimes need to adopt additional practices.

In addition to research and outreach assistance from State and federal agencies, the State Water Resources Control Board has provided some grant funding for dealing with rangeland water quality problems.

Maintaining rangeland in larger parcels

For a variety of reasons, numerous efforts have been made to keep ranches from breaking into many smaller parcels. Historically, one obstacle to maintain property in a larger ownership has been tax loads. Hence, a common tool has been property tax relief and preferential zoning. However, increasingly, lands are protected through market-based compensatory measures such as buying development rights from landowners in the form of conservation easements and granting bigger property tax cuts to farmland owners for longer Williamson Act contracts. Other tools include direct acquisition or facilitation of transfer to a public or non-profit agency. See Legal Frameworks or Institutional Framework: Governance Shifts in the 1990's.

Property tax relief and preferential zoning for rangeland

In the case of agriculture, special zoning comes under the California Land Conservation Act of 1965, commonly referred to as the Williamson Act. Under this act, private landowners may enter into contracts with local government for restricting specific parcels of land to agricultural or related open space use. In exchange, landowners are taxed on values based upon farming and open space uses. These values usually are much less than full market value of the property for other uses so the resultant tax bill is lower. Since the Open Space Subvention Act of 1971, local governments receive an annual subvention of forgone property tax revenues from the State. See California Department of Conservation Williamson Act Program.

Additional protection for farmland was provided in 1998 with the passage (SB 1182) of the Farmland Security Zone provisions of the Williamson Act. Under these provisions, landowners can enter into Williamson Act contracts with a minimum length of 20 years. In exchange, they receive a greater property tax reduction. Local government and school districts also have additional limits placed on taxation, annexation, or taking these lands. The zones are limited to designated categories of farmland of which ranching land, except land used for irrigated pasture, will not qualify (California Department of Conservation, 2002a).

At the end of 1998, almost 16 million acres were enrolled under Williamson Act contracts, statewide. This amount is over half of California's total farm and ranch land. Of this amount, about 5.5 million acres is labeled as prime land. "Prime" covers several categories of higher production capacity under the Williamson Act (GC 51201(c)) including land with a livestock capacity of at least one animal unit per acre per year. The remaining 10.2 million are classified as "non-prime" and usually cover rangeland, open space, and low yielding crops (California Department of Conservation, 2002b).

A similar zoning scheme is provided for timberlands under the Forest Taxation Reform Act. However, there is a gap in this special tax zoning for portions of California's forest and range landscape covered by hardwood forests. The Timber Protection Zone (TPZ) zoning applies to commercial timberlands that generally are defined as those lands covered by and capable of growing conifers. Thus, TPZ does not apply to lands that exclusively grow hardwood species of trees. At the same time, Williamson Act contracts extend to ranches and agricultural operations. Ranches often include hardwoods and even conifer forests. However, for ranches or other private ownerships that do not have Williamson Act coverage, hardwood forests are not covered by special tax zoning. Property taxes on lands that are not zoned TPZ or as Agricultural Preserves may be based on uses such as residential development, which carry much higher values. This is true even if land is currently in forest or range use. Higher taxes add to annual carrying costs to landowners, which may cause them to intensify timber harvests, to sell all or part of the property, or to develop the land for other uses.

Implementation of Williamson Act contracts has been uneven. Implementing ordinances vary in content, application, and enforcement by county. Thus, variations in the protection from different types of conversions and land use pressures lead to smaller parcels with non-forest and non-range development. See California Forest Legacy Program Assessment of Need. In addition, differences in land use policies cause some counties to focus development away from forest and rangelands and others to selectively push development of these lands.

The development restrictions placed on lands participating in the Williamson Act also vary from county to county. Landowners may not renew contracts if they anticipate development opportunities, even if this potential is some distance from urban areas. The number of non-renewed Williamson contracts in the 1990s has been significant in Orange, Placer, Nevada, Riverside, San Bernardino, Contra Costa, Sacramento, Kern, Ventura, El Dorado, Alameda, and San Diego counties. Statewide, from 1996 to 1998, there was an 11 percent increase in the acres of land exposed to future nonagricultural use, from 184,588 acres in 1996 to 205,746 acres in 1998 (California Department of Conservation, 2000).

Responding to constraints

The livestock industry that depends on forest and rangelands in California faces many constraints. Table 20 lists these as profitability constraints. There are also many opportunities for the government to assist and these are listed in the class of opportunity in the same table.

Table 20. Livestock industry profitability constraints in California

Profitability constraints	Seriousness of constraint	Class of opportunity for government programs	Potential economic benefit
Lack of planning and management skills	Moderate	Improve skills and information, including risk management	Large given sizeable number of ranchers
Livestock acquisition and potential animal health and disease problems	Large, especially for potential animal disease and exotics	Genetic technology, animal health, and disease control programs	Large given potential losses to animals from disease or loss of range resource
Livestock predator problems	Moderate because of existing governmental programs	Predator control programs and research. Relaxation of regulations on taking of specific predator individuals	Moderate, but large in specific cases
Regulations and Farm Policies	Moderate, partly because of use of voluntary programs and other existing government support; potential to become large if dependent on interpretation and enforcement	Lower or share compliance costs	Moderate
Debt or financial carrying costs	Large to smaller owners; moderate to others	Preferential tax programs, loans and other financial relief	Large to smaller owners; small to others
Poor demand for existing products	Moderate given stabilized demand for beef	Improved product quality, market research and market development for existing products	Moderate, given industry self help efforts
Low prices	Large	Direct payments or other forms of assistance in both domestic and international markets	Except for trade protection, small given international market pressure to keep prices low
Lack of new products and markets	Moderate given increased industry attention to this area	Assist in new product development and development of niche markets	Moderate
Lack of renumeration in the marketplace for services and goods provided by rangelands	Large in areas where urban pressure high; elsewhere small	Use of tax laws and conservation strategies to provide financial support to ranchers; assistance through regulations that are friendly toward on-farm tourist enterprises, e.g., tours B and Bs	Large, if the values of goods and services can be captured
Dealing with impacts of urban neighbors and values	Large in areas where urban pressure high; elsewhere small	Use of right-to-farm laws, land use planning, education, and public information	Large at the local level, elsewhere small

While qualitative, this table suggests that two areas have both large constraints and potentially large economic benefits of governmental programs in California. The first relates to livestock acquisition and potential animal health and disease problems. The second relates to the lack of renumeration in the market place for services and goods provided by rangelands.

Conclusion

In the opinion of some observers, California's beef cattle industry is at a crossroads. Many operators are nearing retirement age and it may be likely that they will exit the industry (Anderson et al., 2002). The processing sector remains outside of California and market opportunities, especially for smaller producers, may be limited. Even in forest and rangeland areas where cattle ranching has been stable in recent years, ranching will need to remain profitable if the industry is to survive. It remains to be seen if

alternate sources of income and the traditional ingenuity of ranchers will be able to help the forest and range livestock sector survive market swings and urban expectations.

Glossary

animal unit month: The amount of forage required by one "animal unit" (AU) for one month. The animal unit in turn is defined as one mature 1,000-pound cow and calf.

beef: The flesh of an ox, or cow, or of any adult bovine animal, when slaughtered for food.

bovine: Relating to an ox or cow.

Bovine spongiform encephalopathy (BSE): An infectious degenerative brain disease occurring in cattle. Also called mad cow disease.

bulls: A sexually mature adult bovine.

calf: A sexually immature young bovine.

cattle: Domesticated bovine animals as a group regardless of sex or age, including cows, steers, bulls, and oxen.

consumer demand: The idea of demand for a product is an economic concept. The "demand" for a product is a schedule or "curve" that relates quantities that consumers will purchase at different prices. With other things being equal, the greater the price, the less consumers will want at a given price. The lower the price, the more consumers will purchase. At some price, consumers will purchase all that is available of a commodity.

cow: a mature female bovine.

Chronic wasting disease (CWD): transmissible spongiform encephalopathy (TSE) of deer and elk. CWD is typified by chronic weight loss leading to death.

Creutzfeldt-Jakob Disease: A human brain disorder involving rapid decrease of mental function and movement abnormalities caused by damage to the tissues of the brain from a viral-like organism.

cull cows: Cows selected for removal from the herd.

cull ewes: Ewes selected for removal from the herd.

ewes: Female sheep.

Fatal familial insomnia: Genetic disorder that results in the degeneration of certain parts of the brain.

feeder cattle: Bovine animals not more than 18 months of age that are spayed heifers, steers, or non-spayed females that have not calved.

feedlots: A plot of ground on which livestock are fattened for market.

Foot-and-Mouth Disease: FMD is a highly contagious and economically devastating disease of cattle and swine. It also affects sheep, goats, deer, and other cloven-hooved ruminants.

Gerstmann-Straussler-Scheinker Syndrome: Particular form of human transmissible spongiform encephalopathy (TSE) due to a defective gene encoding the prion protein (PRNP gene) and marked by particular multicentric amyloid plaques in the brain.

heifer: A female bovine less than three years of age, which has not borne a calf.

herd size: Size groupings based on number of beef cows on hand.

hothouse lambs: Lambs six weeks old.

Kuru: A human fatal progressive, degenerative neurological disease caused by a slow-acting virus.

lamb: A sheep less than one year of age.

livestock: Domestic animals, such as cattle or horses, raised for home use or for profit, especially on a farm.

milk cows: Cattle that are reared for their milk.

mutton: The flesh of fully-grown sheep.

offal: Waste parts, especially of a butchered animal.

red meat: Beef, sheep, lamb, and goat meat.

scrapie: A usually fatal disease of sheep and goats, marked by chronic itching, loss of muscular coordination, and progressive degeneration of the central nervous system.

sheep: Any of various usually horned ruminant mammals of the genus *Ovis* in the family Bovidae, especially the domesticated species *O. aries,* raised in many breeds for wool, edible flesh, or skin.

shorn: Removed fleece or hair by cutting or clipping.

steer: A young ox, especially one castrated before sexual maturity and raised for beef.

Taylor Grazing: Grazing permits issued under the Taylor Grazing Act of 1934.

transmissible mink encephalopathy: Transmissible mink encephalopathy (TME) is a rare illness that affects the central nervous system of ranch-raised mink.

Literature cited

Alston, Julian M. and David Zilberman. 1998. Science and technology in California agriculture. AIC Issues Brief, No. 4. Davis, CA: University of California, Agricultural Issues Center. Web site accessed January 2002. http://aic.ucdavis.edu/pub/briefs/brief4.html

American Sheep Industry Association. 1999. News and information: Domestic lamb industry adjustment assistance summary of assistance measure. Englewood, CO. Web site accessed January 2002. http://www.sheepusa.org/news/201index/usdasummary.shtml

American Sheep Industry Association. 2001. News & Information: Nearly $20 million paid to producers to date through lamb and wool payment programs; ASI Board votes to realign regions. Englewood, CO. Web site accessed January 2002. http://www.sheepusa.org/news/cfapps/articleView.asp?articleID=1758&articleTypeID=4

American Sheep Industry Association. 2002a. Sheep and the environment: Sheep products. Englewood, CO. Web site accessed January 2002. http://www.sheepusa.org/environment/products.shtml

American Sheep Industry Association. 2002b. The marketplace: Identifying and targeting market outlets. Englewood, CO. Web site accessed January 2002. http://www.sheepusa.org/marketplace/outofstream/matc2.shtml

American Sheep Industry Association. 2002c. Industry efforts. Englewood, CO. Web site accessed June 2002. http://www.sheepusa.org/actplan/checkofffastfacts.shtml

American Society of Farm Managers and Rural Appraisers. 2000. California ASFMRA: Land and lease value surveys. Woolbridge. Web site accessed January 2002. http://www.calasfmra.com/landvalues/index.htm

Anderson, Matt A., Steven C. Blank, Tiffany LaMendola, and Richard J. Sexton. 2002. California's cattle and beef industry at the crossroads. California Agriculture. September/October 2002. Web site accessed June 2002. http://danr.ucop.edu//calag/0205SO/pdfs/crossroads.pdf

Animal and Plant Health Inspection Service. 1996. Reference of 1996 U.S. regional sheep health and management practices. Washington, DC: U.S. Department of Agriculture. Web site accessed January 2002. http://www.aphis.usda.gov/vs/ceah/cahm/Sheep/sheepreg.pdf

Animal and Plant Health Inspection Service. 1997. Fact sheet, wildlife services: Effect of wildlife services on predator populations. Washington, DC: U.S. Department of Agriculture. Web site accessed June 2002. http://www.aphis.usda.gov/oa/pubs/predpop.pdf

Animal and Plant Health Inspection Service. 1998. Part IV: Changes in the U.S. beef cow-calf industry, 1993-97. National Animal Health Monitoring System. Washington, DC: U.S. Department of Agriculture. Web site accessed January 2002. http://www.aphis.usda.gov/vs/ceah/cahm/Beef_Cow-Calf/bf97trnd.htm

Blank, Stephen C. 1999. The beef industry in crisis. Agricultural and resource economics update 3(1). Davis, CA: University of California. Web site accessed January 2002. http://www.agecon.ucdavis.edu/outreach/AREUpdatepdfs/fall99.pdf

Bopp, Suzanne B. 2002. Drovers editorial archives: Benefits of management-intensive grazing. Web site accessed March 2002. http://www.drovers.com/archives/article.ihtml?id=1443

California Agricultural Statistics Service. 2000. California agricultural statistics, 1991-00: Agricultural overview, 2001. Sacramento. Web site accessed January 2002. ftp://www.nass.usda.gov/pub/nass/ca/AgStats/2000-ovw.pdf

California Agricultural Statistics Service. 2001a. Summary of county agricultural commissioners' reports, gross values by commodity groups – California 1990 and 2000. Sacramento. Web site accessed January 2002. http://www.nass.usda.gov/ca/bul/agcom/indexcav.htm

California Agricultural Statistics Service. 2001b. California livestock and dairy. Sacramento. Web site accessed January 2001. ftp://www.nass.usda.gov/pub/nass/ca/AgStats/2000-lvs.pdf

California Agricultural Statistics Service. 2001c. Livestock reviews: livestock highlights. Sacramento. Web site accessed January 2002. http://www.nass.usda.gov/ca/rev/lvstk/indexlv.htm

California Beef Council. 2002. Cattle by-products. Pleasanton, CA. Web site accessed January 2002. http://www.calbeef.org/index.htm

California Department of Conservation. 2000. California farmland conversion report 1996-98. Sacramento: Farmland Mapping and Monitoring Program, Publication #FM 2000-01. Sacramento. Web site accessed January 2002. http://www.consrv.ca.gov/DLRP/fmmp/pubs/1996_1998/FCR/9698rpt_web_entire.pdf

California Department of Conservation. 2002a. Farmland security zones, questions and answers. Sacramento: Division of Land Resource Protection, Farmland Security Zone. Web site accessed January 2002. http://www.consrv.ca.gov/dlrp/lca/farmland_security_zones/index.htm

California Department of Conservation. 2002b. Williamson Act program status: 1997 to 1998 California Land Conservation Act status report – Executive summary. Sacramento. Web site accessed January 2002. http://www.consrv.ca.gov/dlrp/lca/stats_reports/1997_98_summary.htm

California Rangeland Trust. 2000. News roundup: Annual report 1999-2000. Sacramento. Web site accessed January 2002. http://www.rangelandtrust.org/

Campbell, Kate. 2000. Red Bluff bull sale reflects industry trends. In: Ag Alert. February 16, 2000. Web site accessed January 2002. http://www.cfbf.com/agalert/1996-00/2000/aa-0216b.htm

Cattlemen's Beef Board. 2001. Demand for beef grows as new beef products hit the shelves. Centennial, CO. Web site accessed January 2002. http://www.beefboard.org/9691-2%20Beef.pdf

CH2M HILL. 1989. California livestock industry economic model. Report prepared for the California Department of Forestry and Fire Protection.

Coppock, Raymond. 1996. Farmers say regulations complicate farming. California Agriculture (50):4-5. Web site accessed January 2002. http://www.ces.uga.edu/Agriculture/plantpath/docs/FruitsNuts/Newsletter/farmreg.html

Cothern, James H. 2000. Regional alfalfa situation. Center for agricultural business, nineteenth annual agribusiness management conference. Fresno, CA: California Agricultural Technological Institute. Web site accessed January 2002. http://cati.csufresno.edu/Cab/rese/pdfs/Alfalfa00.pdf

Crowder, Vernon. 1996. The California agricultural industry in controller's quarterly California economic challenges. Sacramento, CA: California State Controller's Office. Web site accessed January 2002. http://www.sco.ca.gov/eo/qrtlyrpt/9602/0296caag.htm.

Daley, David A. 2002. Developing alternative markets. In: Annual beef & range field day proceedings. April 18, 2002. Web site accessed June 2002. http://danrrec.ucdavis.edu/sierra_foothill/research.html

Economic Research Service. 1997. Research emphasis, harmony between agriculture and the environment: current issues, Table 15 certified organic livestock, by State, 1997. Washington, DC: U.S. Department of agriculture. Web site accessed January 2002. http://www.ers.usda.gov/Emphases/Harmony/issues/organic/table15.htm

Economic Research Service. 2000a. Agricultural outlook. Washington, DC: U.S. Department of Agriculture. AGO-269. Pp. 7-9. Web site accessed January 2002. http://usda.mannlib.cornell.edu/reports/erssor/economics/ao-bb/2000/ao269.pdf

Economic Research Service. 2000b. Briefing room, cattle: background. Washington, DC: U.S. Department of Agriculture. Web site accessed January 2002. http://www.ers.usda.gov/briefing/cattle/Background.htm

Economic Research Service. 2000c. Agricultural income and finance situation and outlook report. Washington, DC: U.S. Department of Agriculture. AIS-74. Web site accessed January 2002. http://www.ers.usda.gov/briefing/FinancialMarkets/AIS74.pdf

Economic Research Service. 2001. U.S. agricultural trade update. Washington, DC: U.S. Department of Agriculture. FAU 54. Web site accessed January 2002. http://www.ers.usda.gov/publications/so/view.asp?f=trade/fau-bb

Economic Research Service. 2002. Farm financial management: Distribution of farm businesses by net farm income Category, 1996-2000. Washington, DC: U.S. Department of Agriculture. Web site accessed January 2002. http://www.ers.usda.gov/data/farmfinancialmgmt/nficat.htm

Ekboir, Javier M. 1999. Potential impact of foot-and-mount disease in California. Davis: University of California, Agricultural Issues Center, Division of Agriculture and Natural Resources. Web site accessed January 2002. http://aic.ucdavis.edu/pub/fmd.html

Evans, Robyn R. 2000. High-tech cattle auctions catching on in California. Sacramento, CA: California Farm Bureau. Ag alert. January 12, 2000. Web site accessed January 2002. http://www.cfbf.com/agalert/1996-00/2000/aa-0112b.htm

Fire and Resource Assessment Program (FRAP). 2002. Multi-source Land Cover, v02_1. Sacramento, CA. http://frap.cdf.ca.gov/projects/frapgisdata/select.asp.

Fire and Resource Assessment Program (FRAP). 2003. Development Projections (Census 2000), v03_1. Sacramento, CA. http://frap.cdf.ca.gov/data/frapgisdata/select.asp.

Foreign Agriculture Service. 2000. Cattle and beef: NAFTA agricultural fact sheet. Washington, DC: U.S. Department of Agriculture. Web site accessed January 2002. http://www.fas.usda.gov/itp/policy/nafta/cattle.html

Foreign Agricultural Service. 2001. Implications of U.S. and global organic dairy, livestock and poultry production for international trade. Washington, DC: U.S. Department of Agriculture. Web site accessed January 2002. http://www.fas.usda.gov/dlp/highlights/2000/organics/USproduction.html

Hoyt, Seth. 2002. Personal interview. California Agricultural Statistics Service. March 2002.

Johnson, Warren and Harold Carter. 2000. Structural adjustment, resources, global economy to challenge California agriculture. California Agriculture 54:4.

Krauter, Bob. 2000. The 20th century in California agriculture. Ag Alert. January 5, 2000. Web site accessed January 2002. http://www.cfbf.com/agalert/1996-00/2000/aa-0105c.htm

Kuminoff, Nicolai V., Alvin D. Sokolow, and Ray Coppock. 2000a. Agriculture in the Sacramento region, trends and prospects. Davis, CA: University of California, Agricultural Issues Center. Web site accessed January 2002. http://aic.ucdavis.edu/pub/Ag%20in%20Sac.pdf

Kuminoff, Nocolai V., Daniel A. Sumner and George Goldman 2000b. The measure of California's agriculture, 2000. Davis, CA: University of California, Agricultural Issues Issues Center. Web site accessed January 2002. http://aic.ucdavis.edu/pubs/moca.pdf

Kuminoff, Nicolai V., Jose E. Bervejillo and Daniel A. Sumner. 2001a. California's year 2000 international agricultural exports. Issues Brief Number 17. Davis, CA: University of California, Agricultural Issues Center. http://aic.ucdavis.edu/pub/briefs/brief17.pdf

Kuminoff, Nicolai V., Alvine D. Sokolow and Daniel A. Sumner. 2001b. Farmland conversion: Perceptions and realities. Issues Brief Number 16. Davis, CA: University of California, Agricultural Issues Center. Web site accessed January 2002. http://aic.ucdavis.edu/pub/briefs/brief16.pdf

Lambert, Chuck. 2001a. Trade facts: 2000 beef exports increase 7.7% in volume; 10.6 percent in value. Centennial, CO: National Cattlemen's Beef Association. Web site accessed January 2002. http://www.beef.org/index.cfm

Lambert, Chuck. 2001b. Trade data update: Cattle imports increase from Mexico and Canada. Centennial, CO: National Cattlemen's Beef Association. Web site accessed December 2001. http://www.beef.org

Lambert, Chuck. 2001c. Situation outlook: Producer share highest in five and a half years as fed-cattle prices rally. Centennial, CO: National Cattlemen's Beef Association. Web site accessed January 2002. http://www.beef.org/library/economic/outlook/01_03/outlook01_03.htm#4

Land Trust Alliance. 2002a. Public policy: Voters commit nearly $1.7 billion to open space. Washington, DC. Web site accessed March 2002. http://www.lta.org/publicpolicy/landvote2001.htm

Land Trust Alliance. 2002b. Public policy: A new resource for land trusts. Washington, DC. Web site accessed January 2002. http://www.lta.org/publicpolicy/tea21.htm

Lawrence, John and Daniel Otto. 2001. Economics: Economic importance of California's cattle industry. Centennial, CO: National Cattlemen's Beef Association. Web site accessed January 2002. http://www.beef.org

Levi, Annette, Dave Daley, Steve Blank, Glenn Nader. [ND]. Community based demonstration to evaluate the efficacy of direct marketing of forage fed beef. In natural beef: consumer acceptability, market development and economics. Sustainable Agriculture Research and Education Program, University of California, Davis. Web site accessed June 2002. http://www.sarep.ucdavis.edu/grants/Reports/nader/Test.HTM

Liffman, Robin H., Lynn Huntsinger, and Larry C. Forero. 2000. To ranch or not to ranch: Home on the urban range? Journal of Range Management, Volume 53:362-370. Web site accessed January 2002. http://uvalde.tamu.edu/jrm/jul00/liffman.htm

Maas, John., Oltjen, Jim. 2003. Cow-Calf Quality Assurance Program (The Solution). Veterinary Medicine Extension. UC Davis; UC Cooperative Extension Livestock Advisors. Web site accessed September 2003. http://www.vetmed.ucdavis.edu/vetext/Projects/11-COWCALFQA.HTML

Marysville Appeal Democrat. 2001. Farmers turning to tourism for assistance. October 28, 2001.

Meat Industry Internet News Service. 2000. Beef demand takes upward swing after 20-year slide. Web site accessed January 2002. http://www.spcnetwork.com/mii/2000/000151.htm

Morgan Consulting Company. 2002a. California hay production (all, alfalfa and other), 1919 to present. Olathe, Kansas. Web site accessed January 2002. http://www.forage.com/hay/region/us/ca/hayprodcatsa.html

Mueller, Rolf A.E. 2000. Emergent e-commerce in agriculture. Issues Brief Number 14. Davis, CA: University of California, Agricultural Issues Center. Web site accessed January 2002. http://aic.ucdavis.edu/pub/briefs/brief14.pdf

Nader, Glenn and Steven C. Blank. [ND]. How to develop a business plan for a grass-fed beef operation. In: Natural beef: consumer acceptability, market development and economics. Sustainable Agriculture Research and Education Program, University of California, Davis. Web site accessed June 2002. http://www.sarep.ucdavis.edu/grants/Reports/nader/Bus.HTM.

National Agricultural Statistics Service. 2000. U.S. sheep and lamb predator loss in sheep and goats predator loss. U.S. Washington, DC: U.S. Department of Agriculture. Web site accessed January 2002. http://usda.mannlib.cornell.edu/reports/nassr/livestock/pgg-bbsg/predan00.pdf

National Agricultural Statistics Service. 2001a. Agricultural census special tabulations 1982-1997 for California. http://www.usda.gov/nass/nassinfo/datalab/datalabs.htm

National Agricultural Statistics Service. 2001b. Agricultural prices. Washington, DC: U.S. Department ofAgriculture. Web site accessed January 2002. http://usda.mannlib.cornell.edu/reports/nassr/price/pap-bb/2001/agpr0201.txt

National Agricultural Statistics Service. 2001c. U.S. cattle and calves predator loss. Washington, DC: U.S. Department of Agriculture. Web site accessed January 2002. http://usda.mannlib.cornell.edu/reports/nassr/livestock/pct-bbpl/ctpr0501.pdf

National Cattlemen's Beef Association. 2001. U.S. beef demand continues upward trend: Beef industry responds to consumers' convenience-oriented lifestyles. Centennial, CO. Web site accessed January 2002. http://www.beef.org

National Cattleman's Beef Association. 2002. Industry statistics. Centennial, CO. Web site accessed January 2002. http://www.beef.org/index.cfm

NewsMax.com. 2001. Wires: Mad cow had Europe in an uproar. Web site accessed January 2002. http://www.newsmax.com/archives/articles/2001/2/13/172222.shtml

Purcell, Wayne D. 1998. A primer on beef demand. Blacksburg, VA: Virginia Tech University, Department of Agriculture and Applied Economics. Web site accessed January 2002. http://www.aaec.vt.edu/rilp/primer1.pdf

Sierra Club. 1995. California wildlife protection coalition: Trophy hunting of mountain lions: A history of deception. San Francisco. Web site accessed January 2002. http://www.sierraclub.org/ca/mountain-lion/history.html

Sinton, Steve. 1999. A new tool for conserving oak woodlands: The California rangeland trust. Oaks and Folks 14:1. Web site accessed January 2002. http://danr.ucop.edu/ihrmp/oak85.htm

Sokolow, Alvin D. 2000. Agriculture in urbanizing communities, outline of presentation to USDA policy advisory committee on farmland. Listening Forum. Davis, CA: University of California, Department of Human and Community Development. Web site accessed January 2002. http://aic.ucdavis.edu/research/USDA%20ls%207-21-00.pdf.

Souza, Christine. 2000. Ag alert: Williamson Act undergoes revived interest across state. Sacramento, CA: California Farm Bureau Federation. Web site accessed January 2002. http://www.cfbf.com/agalert/1996-00/2000/aa-1206c.htm

Standiford, Richard B. 1999. California's hardwood rangelands: Production and conservation values. Oaks and Folks 14:2. Web site accessed January 2002. http://danr.ucop.edu/ihrmp/oak89.htm.

Sumner, Daniel A. 2001. California Agriculture 2001: Trends and issues. California Chapter of the American Society of Farm Managers and rural appraisers presentation series. Davis, CA: University of California, Agricultural Issues Center. Web site accessed January 2002. http://www.aic.ucdavis.edu/research/caagissues.pdf

Thomas, Lorie. 1999. Economic impact of the elimination of the Wool Act. Prepared for the House Committee on Appropriations, as requested in House Report Number 105-588, page 16, pg 3. Washington, DC: U.S. Department of Agriculture, Economic Research Service. Web site accessed January 2002. http://www.ers.usda.gov/emphases/competitive/wool1.pdf

Timm, Robert M. and Guy E. Connolly. 2001. Sheep-killing coyotes a continuing dilemma for ranchers. California Agriculture 55:6 Nov-Dec 2001. Web site accessed January 2002. http://danr.ucop.edu/calag/01ND/pdfs/predator1769.pdf.

Ward, Clement E. 2002. A review of causes for and consequences of economic concentration in the U.S. meatpacking industry. In: Current Agriculture, Food, and Resource Issues. Number 3. 2002 pp 1-28. Web site accessed June 2002. http://128.233.58.173/cafri/j_pdfs/ward3-1.pdf

U.S. Department of Agriculture. 2000. Beef trends on July 7, 2000. Livestock Monitor.

U.S. Department of Agriculture. 2001. Federal-state marketing improvement program. Washington, DC. Web site accessed January 2002. http://www.ams.usda.gov/tmd/2001%20FSMIP.html

U.S. Department of Agriculture. 2004. Veneman announces additional protection measures to guard against BSE. Release No. 0449.03. Washington, D.C. Web site accessed January 2004. http://www.usda.gov/Newsroom/0449.03.html

U.S. Forest Service. 1998. 1998 report of the Forest Service, Table 40-annual grazing statistics—fiscal year 1998. Washington, DC. Web site accessed June 2002. http://www.fs.fed.us/pl/pdb/98report/table_40.html

U.S. General Accounting Office. 1997. Packers and stockyards programs, USDA's response to studies on concentration in the livestock industry. GAO/RCED-97-100. Washington, DC. Web site accessed January 2002. http://frwebgate.access.gpo.gov/cgi-bin/useftp.cgi?IPaddress=162.140.64.21&filename=rc97100.pdf&directory=/diskb/wais/data/gao

U.S. International Trade Commission. 1997. Cattle and beef: Impact of the NAFTA and the Uruguay round agreements on U.S. trade. Investigation 332-371. Publication No. 3048. Washington, DC. Web site accessed January 2002. http://www.usitc.gov/wais/reports/arc/w3048.htm

U.S. International Trade Commission. 1999. Lamb meat. Investigation No. TA-201-68, Determination and views of the commission, Publication No. 3176. Washington, DC. Web site accessed January 2002. ftp://ftp.usitc.gov/pub/reports/opinions/PUB3176.PDF

U.S. Trade Representative. 1999. WTO finds U.S. trade damaged by EU beef import ban. Press Release 99-58. Washington, DC: Executive Office of the President. Web site accessed January 2002. http://www.ustr.gov/releases/1999/07/99-58.html

Warner, Melinda. December 2000. Cattle producers urged to improve non-fed beef quality. California Farm Bureau Federation, 2000 Ag Alert Archive web page. Web site accessed January, 2002. http://www.cfbf.com/agalert/1996-00/2000/